Photo courtesy of the U.S. Coast Guard

R-TECH™ NEWSLETTER
The Newsletter of the First Responder Technologies Program

Volume 3 • Issue 10 • October 2010

To contact R-Tech
E-mail: RTech@DHS.gov

IN THIS ISSUE

Homeland Security
Science and Technology

This Newsletter discusses technologies of interest to first responders that have received funding, in part, from the government. Mention of these technologies should not be construed as an endorsement of either the technology, or the entity producing it, by the Federal government.

A Note to Our Readers

After the November 2010 issue of the R-Tech Newsletter, you will notice a difference in how you receive the articles that are currently being published within the newsletter. Each article will now be posted individually on the www.FirstResponder.gov Website rather than collected into issues and posted as PDF files. This new format will allow you to access individual articles of interest much faster. We hope this change will make it easier for you to read and print the articles that interest you most. To be notified when new articles are published, subscribe to the newsletter by entering your e-mail address at http://www.firstresponder.gov/Pages/SubscribeToNewsLetter.aspx.

MOBILE ALERT

Cell Phone Alerts May Warn Residents of Danger

When a major weather incident, terrorist threat, or other emergency affects the American population, emergency personnel need a way to inform residents of what to do. Television and radio alerts help spread the word, but they cannot reach everyone. Fortunately, many people carry another method of communication – a cellular phone. In the future, a message could be broadcasted to cellular and paging devices to notify the public of an approaching storm or other emergency.

The Federal Government is developing the Commercial Mobile Alert Service (CMAS), which will harness wireless networks for emergency communication. Two U.S. Department of Homeland Security (DHS) offices – the Science & Technology Directorate (S&T) and the Federal Emergency Management Agency (FEMA) Integrated Public Alert and Warning System (IPAWS) – are working with wireless carriers, including AT&T and Verizon Wireless, to develop a national capability to send emergency alerts to mobile devices. Unlike optional alerts people can subscribe to, CMAS would automatically send emergency messages to cell phones in a given geographic area free of charge. CMAS would become an integral part of IPAWS, which also includes a modernized Emergency Alert System (EAS) and other public alert and warning technologies.

EAS messages, usually broadcast over television or radio, are effective at reaching people in their homes, but the Federal Government must think about connecting with an increasingly mobile American population. Cell phones are ideal for reaching more of the population in more locations – increasing the relevancy and effectiveness of alerts. About 89 percent of the nation's population owned a mobile device as of June 2009, according to the industry group CTIA – The Wireless Association. "[Cellular alerting would] allow emergency managers to have a greater reach to the public," said Denis Gusty, DHS S&T CMAS program manager.

During weather emergencies, the Commercial Mobile Alert Service would send text alerts to cell phone users. Photo courtesy of FEMA.

CMAS would send a free broadcast message to cell phone customers in a geographic area that might be affected by an emergency, according to Gusty. The process would be similar to the AMBER Alert messages

Mobile Alert (continued)

cell phone owners can sign up to receive when a child has been abducted. These messages help marshal public assistance. Virginia Tech, the university where 33 people died during a 2007 school shooting, offers a subscription phone and e-mail emergency alert system in addition to electronic message boards in classrooms and emergency telephone hotlines.

CMAS could distribute presidential alerts, AMBER Alerts, and imminent threat alerts. "Most imminent threat alerts warn residents about storms, including tornadoes and hurricanes," Gusty said. The messages would likely be brief and direct residents to a local resource such as a participating EAS television or radio station for additional information. Cell phone owners who did not want to receive the notifications would be able to opt out of receiving imminent threat or AMBER Alert messages, but not the presidential alerts.

Sending broadcast messages directly to residents would help prevent panic during an emergency, according to Kevin McGinnis, program advisor for the National Association of State EMS Officials. McGinnis served on the Federal Communications Commission (FCC) Commercial Mobile Service Alert Advisory Committee (CMSAAC), which helped establish the initial requirements for CMAS in 2007, and participated in the CMAS Stakeholder Forum discussing the project in July 2009.

The Commercial Mobile Alert Service would notify cell phone users in the event of an emergency. Photo courtesy of FEMA.

CMAS alerts would inform residents of the proper course of action to take in an emergency. For example, CMAS alerts could deliver information to residents about whether or not it was necessary to evacuate or shelter in place. Providing this critical information can help reduce the influx of telephone calls from frantic residents to 911 communications centers. CMAS would send residents the information they need directly to their cell phones and refer them to appropriate sources for more details. "You have people who suddenly know there is a problem and there is a solution, and both are appearing on their mobile phone," McGinnis said.

"Government agencies worked with wireless carriers for a year to develop specifications that will allow federal equipment to interface with commercial cellular networks," Gusty said. FEMA and FCC officials announced the adoption of the C Interface Specification on Dec. 7, 2009, which marked the start of a 28-month timeframe for the wireless industry to build the network infrastructure needed to carry CMAS messages, according to FEMA. The system could be operational sooner than the April 2012 deadline established by the FCC pursuant to the Warning, Alert, and Response Network Act, according to Gusty. The law, part of the SAFE Port Act of 2006, mandated the development of CMAS.

The C Interface Specification is based on the Organization for the Advancement of Structural Information Standards (OASIS) Common Alerting Protocol (CAP) and the CAP IPAWS Profile. DHS worked with local, State, and tribal officials to develop requirements for the CAP IPAWS Profile version 1.2 and submitted these requirements to OASIS, a not-for-profit consortium that drives the development, convergence and adoption of open standards for the global information society. OASIS approved the CAP IPAWS Profile on Oct. 13, 2009. The CAP standard will allow messages to be used across multiple alert systems, according to FEMA. It is part of FEMA's effort to develop the IPAWS and its key component CMAS as the next generation of emergency alert infrastructure. "We are pleased with the recent progress," said Antwane Johnson, IPAWS director. "The input received from industry and other stakeholders has been vital to developing a profile that will meet the needs of the emergency alerting community."

Mobile Alert (continued)

More than 80 stakeholders attended a DHS S&T stakeholder event, the CMAS Stakeholder Forum, where members of local, State, and Federal governments, industry, and academia reviewed CMAS research and development efforts last year. Participants also discussed the necessary next steps to make the system a reality.

A key area of discussion has focused on how to determine the size of the area where an alert should be sent, according to McGinnis. The existing EAS distributes alerts by county, but CMAS could potentially target a smaller area near a cell tower or on a global positioning system grid, he said. Federal officials and stakeholders need to determine how best to notify the people affected during an emergency.

To learn more about CMAS, visit http://cmasforum.com.

CARE ON THE RUN

Doctors Devise Electronic Medical Record System for Marathon Participants

The runner struggled to stay on course, his legs buckling beneath him. The road, dotted with other marathon runners, seemed to spin and blur as he collapsed to the ground. Then everything went black.

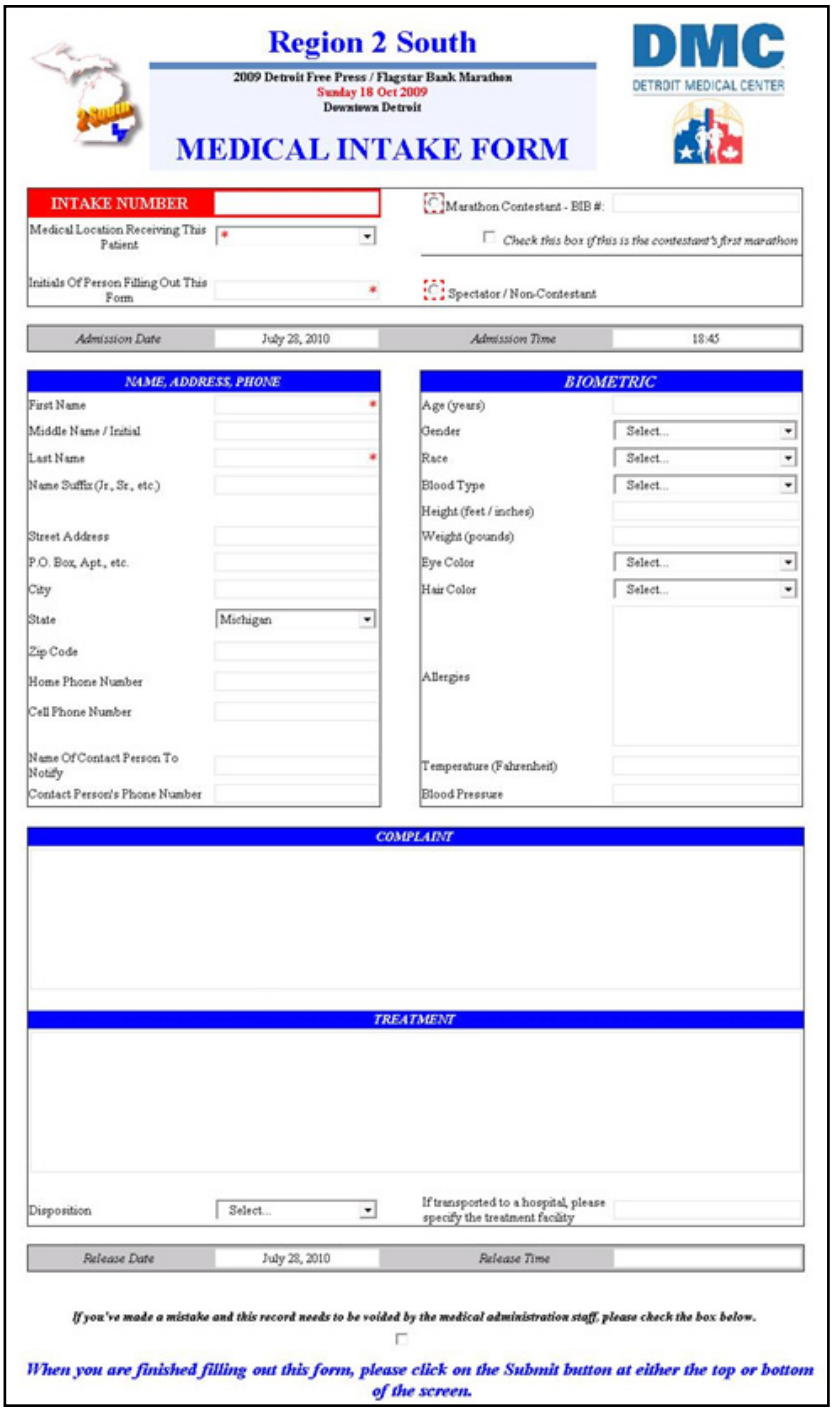
More than 9,700 people run in the 2009 Detroit Free Press Marathon. The marathon's medical staff uses electronic medical records to coordinate patient care during the event. Photo courtesy of the Detroit Free Press Marathon.

This scenario can occur all too often during a typical marathon, when hundreds of runners and people attending the event require treatment for ailments such as heat exhaustion, sprains, dehydration, and cardiac arrest. In a throng of thousands of people, medical personnel must care for these patients and transport those who are seriously ill to the hospital. To handle this task more efficiently, medical personnel who volunteered to staff the Detroit Free Press Marathon set up an electronic record system to track where patients sought treatment, the care they received, and where they were transported. The system, first used at the October 2009 marathon and in use again for this year's event, helped the event's volunteer medical staff coordinate patient care across the 26.2-mile course through Detroit and the Canadian city of Windsor, Ontario.

The staff operated medical tents near the starting/finish line of the looped course, at the 11-mile marker, and at the 18-mile marker, as well as a separate medical administration area. There was no formal system in place to share patient information between these stations prior to 2009, said Dr. Jenny Atas, a physician at the Detroit Medical Center who serves as the marathon's medical director. This made it challenging to help families locate marathon runners who had fallen ill. "We somehow needed to be able to identify when a runner, identified only by their bib number, has dropped out of the race to seek medical care," said Atas.

Care on the Run (continued)

When the Detroit Medical Center became the marathon's lead medical center for the 2009 event, Atas and her colleagues decided to use electronic medical records so the various medical tents had access to the same patient information. In 2001, Michigan identified eight Regional Medical Bio-Defense Networks to accomplish medical surge capacity and capability. The Region 2 South Medical Bio-Defense Network, where Atas is the medical director, supplied the equipment for the marathon, using grant funds awarded to the Michigan Department of Community Health's Office of Public Health Preparedness by the U.S. Department of Health and Human Services Office of the Assistant Secretary for Preparedness and Response Hospital Preparedness Program.



Region 2 South

2009 Detroit Free Press / Flagstar Bank Marathon
Sunday 18 Oct 2009
Downtown Detroit

MEDICAL INTAKE FORM

DMC
DETROIT MEDICAL CENTER

INTAKE NUMBER

Medical Location Receiving This Patient *

Initials Of Person Filling Out This Form *

Marathon Contestant - BIB #:

Check this box if this is the contestant's first marathon

Spectator / Non-Contestant

Admission Date: July 28, 2010 | Admission Time: 18:45

NAME, ADDRESS, PHONE

First Name *
Middle Name / Initial
Last Name *
Name Suffix (Jr., Sr., etc.)
Street Address
P.O. Box, Apt., etc.
City
State: Michigan
Zip Code
Home Phone Number
Cell Phone Number
Name Of Contact Person To Notify
Contact Person's Phone Number

BIOMETRIC

Age (years)
Gender: Select...
Race: Select...
Blood Type: Select...
Height (feet / inches)
Weight (pounds)
Eye Color: Select...
Hair Color: Select...
Allergies
Temperature (Fahrenheit)
Blood Pressure

COMPLAINT

TREATMENT

Disposition: Select...
If transported to a hospital, please specify the treatment facility

Release Date: July 28, 2010 | Release Time

If you've made a mistake and this record needs to be voided by the medical administration staff, please check the box below.

When you are finished filling out this form, please click on the Submit button at either the top or bottom of the screen.

During the Detroit Free Press Marathon, the medical staff members use this list of electronic records to coordinate patient care along the race route. Image courtesy of the Region 2 South Medical Bio-Defense Network.

Using laptops with Internet access, the three first aid stations could fill out an emergency medical record form each time a patient sought care. The form, which was created by the Region 2 South Medical Bio-Defense Network, contained the patient's name, marathon bib number, vital signs, and other medical information. The information was kept on a secure shared drive that all the marathon medical personnel could access online. Each form was coded with a blind identifying number to protect patient privacy. The system made it possible for personnel at any location to check if a runner previously received medical care along the marathon route or to inform relatives whether a patient had been taken to the hospital or treated and released. "You've got very anxious family members there that want to know what happened to their loved ones," Atas said.

In addition to being able to share information easily along the route, medical personnel did not need to worry about keeping track of paper charts, according Dr. Christopher Guyer, an athletic medicine physician at Henry Ford Hospital who volunteered at the marathon. "People want to go paperless, and they want something that's an easy solution," he said. "This doesn't require a huge capital investment."

Doctors also were able to immediately look at injury data from the marathon, according to Guyer. He presented a study on the use of the electronic medical records system during the 2009 marathon at the American Medical Society of Sports Medicine annual meeting in April 2010. During the 2009 Detroit Free Press Marathon, volunteer medical personnel treated 216 patients, including three patients who suffered sudden cardiac arrest. About half of the patients had sprains, strains, or contusions, according to Guyer. Others reported feeling dehydrated or dizzy. Having access to immediate data will help

Care on the Run (continued)

medical personnel look for patterns, such as large numbers of patients with heat stress or dehydration, and take appropriate action to prevent more cases, said Atas.

The marathon project demonstrated how electronic medical records could be used effectively outside of hospitals, according to Linda Scott, manager of the Health Care Preparedness Program for the Michigan Department of Community Health's Office of Public Health Preparedness. "The electronic medical records project will also augment what we are doing to deal with a medical surge event," said Scott.

For more information about the project participants, visit http://2south.com and www.michigan.gov/ophp.

Runners participating in the 2009 Detroit Free Press Marathon cross the Ambassador Bridge connecting Detroit to Canada. The event's medical personnel use electronic records to coordinate patient care. Photo courtesy of the Detroit Free Press Marathon.

Q&A WITH R-TECH

The DHS TechSolutions Program

The First Responder Technologies (R-Tech) TechSolutions program provides technology solutions that address high-priority capability gaps identified by the first responder community via the TechSolutions Website, www.TechSolutions.DHS.gov. The program searches for existing technologies that satisfy requirements, and if no existing technologies are found, the request is considered for prototype development. The TechSolutions program engages first responder subject matter experts (SMEs) to evaluate technology gaps and product idea submissions.

A program of the Department of Homeland Security Science and Technology Directorate (DHS S&T), R-Tech strives to protect America against terrorism and disasters by providing first responder solutions for high-priority capability gaps through rapid prototyping, technical assistance, and information sharing in order to save lives and maximize preparedness.

Q: What are the high-priority technology needs in your geographic area that are not available as Commercial-off-the-Shelf products?

A: Effective and comprehensive three-dimensional responder tracking technology continues to be a highly needed and desirable solution that evades commercialization. This would mean the ability to not only track responders during operations in three dimensions, but simultaneously monitor certain vital health information. Its implementation would have a tremendous positive impact on responder safety and operational efficiency. [*Editor's Note: For more information on the first responder tracking system DHS S&T is developing, visit* www.firstresponder.gov/NewsLetters/October%202008.pdf *and* www.firstresponder.gov/NewsLetters/December%202008.pdf.]

Instrumentation capable of swiftly and accurately analyzing [chemical] contamination in the human body in the field is still unavailable. For emergency medical responders and receivers, it would aid in patient care to be able to assess contamination levels in the body to aid in determining the best field treatment or antidote.

For high-security facilities and mass transit stations, technologies that can scan for explosives or their precursors are needed to broaden our nation's responders' ability to effectively screen passengers for potential threats. Technology that uses no sample preparation and is non-invasive would greatly improve the passive capability of law

Q&A with R-Tech (continued)

enforcement to more quickly identify targets for supplemental screening. [*Editor's Note: For more information on the development of standoff explosive detection devices, visit* www.firstresponder.gov/NewsLetters/September%202010.pdf]

Q: In your opinion, what are the most significant technology advances in your discipline in recent years?

A: In emergency management specifically, improved decision-support tools for on-site hazard analysis. They have greatly aided incident commanders in reducing the overall impact of incidents where suspected contaminants threaten a population. Various optical spectroscopy and atmospheric sensory technologies have rapidly matured since the September 11, 2001 attacks. These technologies have enabled responders to access more tools for rapid presumptive threat assessment in the field. There is more work to do to effectively fuse sensor technologies to meet the ultimate responder needs, such as broader sensor awareness capabilities across the threat spectrum and increased reliability and specificity. However, there are many more options available today than there were 10 years ago to assess the magnitude of any potential threat.

Q: What personal technology successes, best practices, or collaborative projects can you share that would benefit others in your discipline?

A: I have had the pleasure of working with staff from the Army Research Lab [in Aberdeen, Md.] on the ongoing work of transferring a particular detection and identification technology – laser-induced breakdown spectroscopy (LIBS) – to the first responder world. The technology holds promise for responders as an elemental analysis tool. It requires little or no sample preparation, and can analyze threat materials across the chemical, biological, radiological, nuclear, and explosive (CBRNE) spectrum. It promises to be a useful tool that we can add to the responders' toolbox within the next few years.

One of the most useful sensor-fused technologies that I have worked with is the SAFESITE Multi-Threat Wireless Detection System. I use it annually to aid in securing the Creation Festival – the largest Christian music festival in the country. Each year, we have between 70,000 and 110,000 guests arrive on a farm in our county to enjoy the festival. We use the instruments to help passively screen vehicles entering the farm through the gates, and we placed them throughout the pedestrian areas and the arena. The sensors scan for atmospheric gases, volatile organic compounds, chemical warfare agents, and gamma radiation sources. During the three years I have deployed them, we have prevented at least 15 potentially serious fires due to propane and gasoline releases, and even identified a chemical spill near the stage early in the morning. The capability to passively scan for threats and have alerts pushed to staff, as opposed to attempting to scan all of these areas with personnel, has relieved the need for a large number of monitoring staff and helped us identify threats to public safety more effectively

Adam Miller
Director of Emergency Management
Huntingdon County Emergency Management Agency
Huntingdon County, Pennsylvania

Work Experience: 13 years in public safety, including eight years as director of the Huntingdon County Emergency Management Agency. Miller also has worked in law enforcement since 1997.

Service: Co-principal investigator at Juniata College of laser-induced breakdown spectroscopy (LIBS) with the U.S. Army Research Laboratory and A3 Technologies LLC; member of the executive board of the South Central Mountains Regional (Counter-Terrorism) Task Force in Pennsylvania; past member of the Validation Board for the U.S. Department of Defense 1401 Technology Transfer Program; author of the self-published study "Effectively Recruiting and Retaining Volunteers in Rural Emergency Services Through Better Management;" and presented LIBS technology research at the 2008 International Laser-Induced Breakdown Spectroscopy Conference in Berlin, Germany and at the 2009 Euro-Mediterranean Symposium on Laser-Induced Breakdown Spectroscopy in Tivoli, Italy.

Expertise: Technology development and transfer.

Q&A with R-Tech (continued)

and efficiently than we could using physical security personnel alone.

Q: What research and development would you like to see conducted in the next 12 to 15 months, based on the aforementioned high-priority needs?

A: A hard evaluation of all potentially useful technological approaches to handheld detection and identification sciences. That evaluation needs to be conducted independently across the industry. It is critical that we undertake a structured study to determine what unmet needs can be met by near-commercialization-ready technologies. This will help us understand the best path forward for investment in technology development and transfer. On a parallel but secondary track, potential technological solutions whose concepts have been proven should be evaluated to identify which technologies could be marketable in three and five years. That will help investment standardize an approach to meeting these key challenges.

Q: DHS S&T is focusing on near-term needs first. When you consider the future, can you describe the "Holy Grail" of technologies that would solve some of your biggest problems?

A: The "Holy Grail" of first responder technology, in my opinion, is a simple and straightforward handheld sensor suite that can near-instantaneously detect and classify, if not identify, threats to the responder from the environment. Scanning at venue security checkpoints is laborious, and it's slowed by the lack of affordable, field-portable instrumentation that analyze threats across the CBRNE spectrum. These obstacles, among others, would be more easily overcome with a sensor-fused instrument that could be applied to a broad array of mission requirements. Given the economic constraints faced by most of America's first response organizations, I believe it would be better to have a compact sensor suite tool in the hands of most organizations than it would be to have a hodge-podge of threat-specific instrumentation spread across a region. Broad threat detection should ideally be as accessible and affordable for all responders as thermal imaging cameras are for firefighters.

EVENTS AND ACTIVITIES

Fourth Annual New York Police, Fire & EMS Expo

November 3, 2010 – November 4, 2010

The New York Police, Fire & EMS Expo will celebrate its fourth year by bringing together more than 200 of the nation's finest companies to showcase thousands of products and services at the Javits Center in New York City. This year's event has an expanded focus and includes all emergency responders, regardless of discipline.

2010 IEEE International Conference on Technologies for Homeland Security

November 8, 2010 – November 10, 2010

The Institute of Electrical and Electronics Engineers (IEEE) Conference on Technologies for Homeland Security addresses critical technology issues and unites innovators from universities, research laboratories, U.S. Department of Homeland Security Centers of Excellence, businesses, system integrators, and end users to discuss ideas and experimental results. The event will be held in Waltham, MA.

New Jersey EMS Conference

November 11, 2010 – November 13, 2010

The New Jersey EMS Conference, located in Atlantic City, NJ, offers more than 60 sessions. These sessions are divided into clearly defined tracks: EMS administrators, physicians, educators, basic and advanced life support providers, and school nurses. These tracks allow attendees to pursue their specific areas of interest.

Personal Protective Equipment Conference 2010

November 29, 2010 – December 3, 2010

The Personal Protective Equipment (PPE) Conference provides the Technical Support Working Group and its partners with a forum to highlight emerging technologies in the area of PPE. PPE 2010, which will be held in Fort Lauderdale, FL, will include an exhibition of new technologies from PPE vendors, focused briefings on emerging PPE capabilities, and a seminar series on standards and next-generation tools.

BRIEFING ROOM

DHS First Responder Communities of Practice

First Responder Communities of Practice is a professional networking, collaboration, and communication platform. Created by the Department of Homeland Security (DHS) Science & Technology Directorate, this vetted community of members focuses on emergency preparedness, response, recovery, and other homeland security issues. Members can network with others in their fields and areas of interest through wikis, blogs, discussion boards, real-time chat, and e-mail. The First Responder Communities of Practice Website also reports on the emergency response community's broader efforts to use social media to improve disaster preparedness.

To request membership, please visit https://Communities.FirstResponder.gov.

Website Demonstrations Available

The First Responder Communities of Practice team provides demonstrations for groups on how to effectively use the site's many features. The team recently demonstrated the Communities of Practice Website to 32 practitioners from across the country involved in the Virtual USA program, explaining how to use the site's online collaboration and networking features. Virtual USA is an innovative information-sharing system that helps local, state, tribal, and Federal first responders work with all levels of government. To schedule a Website demonstration like this, e-mail RTech@DHS.gov.

Tips for Using Social Media

Here are a few suggestions emergency responders shared for using social media effectively:

- Use RSS feeds to automatically populate your department's Facebook page with valuable material, such as weather and traffic alerts from established sources.
- Post a "Tip of the Week" – short, relevant tips of information to keep an audience engaged in between emergencies – to your various social media sites. Filming this tip and posting a short video makes it more interesting as well.

CHECK OUT THE NEW COMMUNITIES

First Responder Communities of Practice has added two new Communities:

1. **Decontamination**:
   This Community is an outgrowth of a recent focus group held by DHS S&T's TechSolutions program. Participants in the focus group identified First Responder Communities of Practice as an excellent place to continue discussions, collaborate, and share resources on decontamination. The group focuses on issues related to the decontamination of personnel and equipment, as well as the challenges in planning for special events such as sporting events, cold weather response, and political conventions. The Community serves as a platform for first responders from departments and disciplines involved in hazardous materials and decontamination efforts across the country to share their lessons learned and best practices.

2. **Community Administrator Tips Community**:
   This Community serves as a forum for Communities of Practice members who are currently serving as, or interested in becoming, Community administrators. The Community is regularly populated with resources for engaging online users. Additional topics discussed on in the Community include how to request and build out a new Community, how to invite new members, and how to encourage Community participation.

DHS S&T FIRST RESPONDER COMMUNITIES OF PRACTICE